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### (54) CORBA and Java-based distributed object oriented system

(57) An apparatus for dynamic derivatives desktops and methods of operating the same result in a dynamic derivatives desktop server for a CORBA (Common Object Request Broker Architecture) operating system that processes analytic requests without compromising the analytics of the analysis. The dynamic derivatives desk-

top server comprises an ORB (Object Request Broker) interface which receives an analytic request from the CORBA operating system. A Java applet coupled to the ORB interface having analytics which processes the analytic request to provide analytic results to the ORB interface.

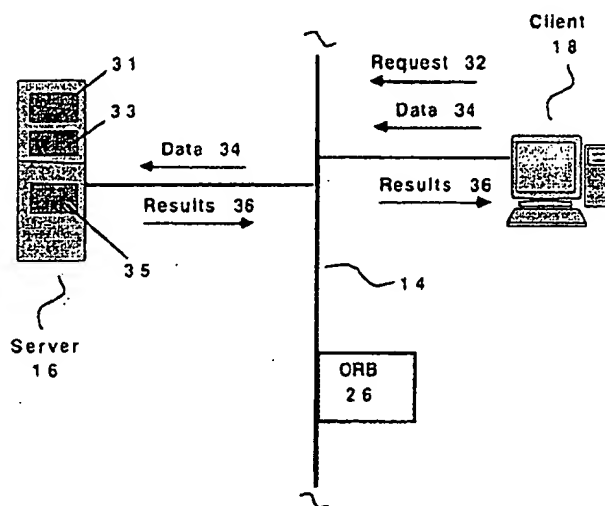


Fig. 2

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## Description

This invention relates to methods and apparatus for dynamic derivatives desktops.

As the internet becomes more and more popular, desktop trading is also becoming more and more popular. Today, the desktop traders have many risk management tools available to them. The traders use a variety of custom developed tools and spread sheets to calculate risks on portfolio positions. The analytics used to calculate these risk positions are sophisticated, especially in the area of derivatives trading.

Many private investors with large holding are interested in obtaining these risk management tools; however, in providing these risk management tools, the financial service providers also make available the analytical formulas for the risk management tools. In almost all cases, the analytics are proprietary and the financial service providers desire to protect the secrecy of the analytics. Currently, most financial services provides supply binary code for the risk management applications that are given to the private investors. The binary code hides to some degree the analytics of the risk management tools but is still open to reverse engineering of the analytics. Other drawbacks of encoding the risk management applications include requiring on-site system administrators to install and maintain the software.

Ensuring the clients possess the latest version of the risk management tools in the fast paced trading market adds to the cost of doing business in the financial services. Particularly, in short term markets, it is difficult to deploy software to all parties in a timely fashion. As desktop trading becomes more and more popular and the number of private investors interested in obtaining the risk management tools increases, the financial service providers are forced to limit the number of available services as well as the frequency of updates they can offer.

Therefore, it is desirable to provide an apparatus and methods of operating the same which enable clients to access the risk management tools that addresses disadvantages such as security of analytics and timely software distribution of the risk management tools.

Various respective aspects and features of the invention are defined in the appended claims.

Embodiments of the present invention relate to distribution of analytical risk management software tools in a CORBA (Common Object Request Broker Architecture) environment and more particularly to enable access to the analytical risk management software tools without compromising the analytics.

The present invention provides an apparatus for dynamic distributive desktops and methods for operating the same which result in client accessibility to the risk management tools without accessibility to the analytics of the risk management tools. The novel dynamic distributive desktop is based on encoding the analytic of the risk management tools as object-oriented Java ap-

plets: Thus, according to one aspect of the invention, a dynamic derivatives desktop server in a CORBA operating system comprises an ORB (Object Request Broker) interface which receives an analytic request from the CORBA operating system. A Java applet coupled to the ORB interface having analytics processes the analytic request to provide analytic results to the ORB interface.

According to another aspect of the invention, the analytic request includes client data for the analytics to process the analytic request. The analytics include derivatives analytics for risk management and are proprietary to financial services which provide the analytics.

According to another aspect of the invention, the dynamic derivatives desktop includes access resources which provides dynamically configurable access to the Java applet. The access resources enables access to the Java applets which reside on the dynamic derivatives desktop. The Java applets are dynamically upgradable so latest versions of the Java applets are available to process the analytic requests and provide results.

According to yet another aspect of the invention, a distributed object-oriented analytical risk management system having a CORBA (Common Object Request Broker Architecture) on a TCP/IP network with an ORB (Object Request Broker) comprises a client platform coupled to the TCP/IP network to provide a risk management request to the ORB. A risk management server having analytics which receives the risk management request from the ORB and calculates risk results in response to the risk management request.

According to another aspect of the invention, the risk management server provides the risk results to the ORB, and the client platform receives the risk results from the ORB. The risk management server includes a Java applet to provide the analytics to calculate the risk results for the client platform. The risk management request includes client data to provide inputs for the analytics of the Java applet.

An apparatus and method for operating dynamic distributive desktops are provided by encoding the analytics of the risk management tool as distributed object-oriented Java applets. Clients have access to execute risk management tools but are isolated from the analytics of the risk management tools. Clients provide the data for the particular risk analysis and receives the results. Also, by having the risk management tools reside on a server outside the control and reach of end users, the analytics are dynamically configurable and yet protectable. Thus, clients requesting risk analysis receive the latest version of the analytics.

The invention will now be described by way of example with reference to the accompanying drawings, throughout which like parts are referred to by like references, and in which:

Fig. 1 illustrates a system level block diagram of a

distributed object-oriented system;

Fig. 2 illustrates a block diagram for processing a risk management request in the distributed object-oriented system in accordance with the present invention; and

Fig. 3 illustrates a block diagram of a dynamic distributive desktop server in accordance with the present invention.

Embodiments of the invention will be described with respect to the Figures in which Fig. 1 generally shows a distributed object-oriented system 10. The distributed object-oriented system 10 includes a TCP/IP (Transmission Control Protocol over Internet Protocol) network 14, a server 16, a client 18, a client 20, a client 22, a client 24, and an ORB (Object Request Broker) 26 which operate in a CORBA (Common Object Request Broker Architecture) environment. The TCP/IP network 14 includes other represented segments such as the Internet, intranets, and local area networks.

CORBA provides interoperability among a rapidly proliferating number of hardware and software products. Applications built in the CORBA environment are interoperable even though the applications are built in different languages, running on different machines in heterogeneous distributed environments. CORBA is designed for distributed objects and is being developed by the Object Management Group (OMG). The OMG is a consortium of software vendors and end users. CORBA provides the mechanisms by which objects transparently make requests and receive responses.

The (ORB) is the middleware that establishes the client-server relationships between objects in CORBA. Using an ORB, a client can transparently invoke an application on a server object to service the request of the client, which can be on the same machine or across a network. To accomplish this task, the ORB intercepts the call and finds an object that can implement the request, pass it the parameters, invoke object to process the request, and return the results. The client does not have to be aware of where the object is located, its programming language, its operating system, or any other system aspects that are not part of an object's interface. In so doing, the ORB provides interoperability between applications on different machines in heterogeneous distributed environments and seamlessly interconnects multiple object systems.

Referring to Fig. 1, network connection 17 provides the server 16 access to the TCP/IP network 14. Network connection 19 provides the client 18 access to the TCP/IP network 14. Network connection 21 provides the client 20 access to the TCP/IP network 14. Network connection 23 provides the client 22 access to the TCP/IP network 14. Network connection 25 provides the client 24 access to the TCP/IP network 14, and network connection 27 provides the ORB 26 access to the TCP/IP network 14.

The server 16 includes a software operating system

loaded into the logic circuits of the server 16 that performs a series of steps to control the operations of the server 16. Server systems and subsystems incorporating features of the present invention can be implemented entirely in hardware, or in a combination of hardware and software (i.e. program modules stored in memory). For example, the server 16 includes Java applets but is not restricted to the Java applets that are programmed to the logic circuits to perform a series of steps dictated by the Java applets. Using the ORB 26, clients 18, 20, 22, and 24 obtain access to the server 16 for certain risk management analysis. The risk management analysis includes calculation of risks on portfolio positions for clients. Clients 18, 20, 22 and 24 are based on different hardware machines having logic circuits programmed to execute different operating systems. However, the ORB 26 in the CORBA environment provides an infrastructure for the distributed object-oriented system 10 that enables the clients 18, 20, 22, and 24 to interface with the server 16. Thus, clients having the ORB 26 infrastructure transparently communicate with the server 16 to service their requests for risk analysis.

In the CORBA environment, requests for risk analysis on portfolio positions for a client are transferred to the TCP/IP network 14. Client data for the risk analysis are also transferred to the TCP/IP network 14. The ORB 26 receives the requests for risk analysis and invokes the server 16 to service the requests from the clients. Server 16 performs risk analysis based on the client data transferred by the client. Once the risk analysis is complete, results of the risk analysis are transferred to the respective requesting clients.

Fig. 2 illustrates a block diagram of a risk management analysis request from the client 18 to the server 16 operating in the CORBA environment. The client 18 transfers a risk management request 32 via the network connection 19 to request a risk analysis on portfolio positions to the TCP/IP network 14. Data 34 associated with the risk analysis on the portfolio positions is also transferred to the TCP/IP network 14 via the network connection 19. The ORB 26 intercepts the risk management object request 32 from the client 18 and directs the risk management request 32 to the server 16.

The server 16 includes a plurality of Java applets 31, 33, and 35. The ORB 26 directs the Java applet 35 to process the risk management object request 32. The Java applet 35 receives the data 34 via the network connection 17 coupled to the TCP/IP network 14 and calculates the risk results 36 on the portfolio positions from the data 34. The server 16 returns the risk results 36 via the network connection 17 to the TCP/IP network 14. The ORB 26 which resides on the TCP/IP network 14 retrieves the risk results 36 and transfers the risk results 36 to the requesting client 18 via the network connection 19.

Using the ORB infrastructure, a client requesting the risk analysis computations transfers a request and the associated data to the ORB. After the risk analysis

computations are completed, the ORB directs the return of the results from the risk analysis to the client. Therefore, clients are isolated from the computational analytics of the risk analysis computations. Thus, the often proprietary analytical formulas are protected from the clients that request the analytic computations. Furthermore, localizing the Java applets on the server 16 affords dynamically configurable access to the Java applets. Java applets which reside on the server can be replaced with upgraded Java applets. Access resources of the server provide upgrades to the Java applets. The upgraded Java applets are accessible to the ORB and the clients of the distributed object-oriented system. Moreover, the access resources can dynamically configure the Java on the server based on the identity of a client making the request.

Fig. 3 illustrates a block diagram of the server 16.

The server 16 includes a Java applet 31, a Java applet 33, a Java applet 35, an ORB interface 46 and an access resource 48. The Java applet 31 includes analytics 41. The Java applet 33 includes analytics 43, and the Java applet 35 includes analytics 45. Each Java applet provides a particular analytical risk management function and is computer-readable code when loaded into the logic circuits of the server 16 performs a series of specifically identified operations dictated by the Java applet. The analytics for the Java applets are proprietary. The ORB interface 46 provides an infrastructure for the server 16 to operate in the CORBA environment. The ORB interface 46 includes a data interface 47 and a result interface 49. Once a Java applet is directed to perform the computations for a risk management request, the Java applet receives the data 34 (Fig. 2) associated with the risk management request via the data interface 47. After the computations are complete, the results 36 of the risk management request are transferred to the results interface 49. The access resource 48 dynamically configures the Java applets to afford upgrades to the Java applets.

Transforming the analytics of risk management tools as coded Java applets affords fast distribution of the risk management tools without revealing the analytics for the risk management tools to the requesting clients. A requesting client supplies the data for the particular type of risk management analysis. Once the risk management analysis is complete, the risk results are returned to the requesting client. Furthermore, the requesting client receives the most recent versions of the analytics because the Java applets which reside on the server are accessible and are dynamically configured to provide the most up to date analytics.

While the foregoing detailed description has described several embodiments of the apparatus and methods for providing dynamic derivatives desktops in accordance with this invention, it is to be understood that the above description is illustrative only and not limiting of the disclosed invention. Obviously, many modifications and variations will be apparent to the practitioners

skilled in this art. Accordingly, the apparatus and methods for providing dynamic derivatives desktops has been provided. The dynamic derivatives desktops afford fast distribution of risk management tools without revealing the analytics of the risk management tool to the requesting clients. Java applets encode the analytics of the risk management tools. Clients requesting a risk management analysis provide the input data associated with the risk analysis and receive result data from the analysis.

Particular and preferred aspects of the invention are set out in the accompanying independent and dependent claims. Features of the dependent claims may be combined with those of the independent claims as appropriate and in combinations other than those explicitly set out in the claims.

#### Claims

1. A dynamic derivatives desktop server in an object-oriented environment, the server comprising:
  - an object-oriented interface configured to receive an analytic request from an end user; and
  - an applet depository coupled to the object-oriented interface having a plurality of applet resources to provide analytics for processing the analytic request while protecting computational analytics from the end user.
2. The dynamic derivatives desktop server according to claim 1, wherein the analytic request includes client data for the analytics.
3. The dynamic derivatives desktop server according to claim 1, wherein the analytics include derivatives analytics for risk management.
4. The dynamic derivatives desktop server according to claim 3, wherein the applets include Java applets.
5. The dynamic derivatives desktop according to claim 1 further comprising access resources which provides dynamically configurable access to the applets.
6. A distributed object-oriented analytical risk management system on a TCP/IP network having an object-oriented request interface comprising:
  - a client platform coupled to the TCP/IP network to provide a risk management request to the object-oriented request interface;
  - a risk management server having analytics which receives the risk management request from the object-oriented request interface and calculates risk results in response to the risk

management request.

7. The distributed object-oriented analytical risk management system according to claim 6, wherein:

the risk management server provides the risk results to the object-oriented request interface; and  
the client platform receives the risk results from the object-oriented request interface.

8. The distributed object-oriented analytical risk management system according to claim 7, wherein the risk management server includes a Java applet to provide the analytics to calculate the risk results for the client platform.

9. The distributed object-oriented analytical risk management system according to claim 8, wherein the risk management request includes client data to provide inputs for the analytics of the Java applet.

10. The distributed object-oriented analytical risk management system according to claim 8, wherein the analytics are proprietary.

11. The distributed object-oriented analytical risk management system according to claim 9, wherein the risk management server includes access resources to dynamically configure access to the Java applet.

12. A method of operating an analytical risk management tool in an object-oriented system having an object-oriented request interface comprising the steps:

requesting an analytical risk management calculation;  
supplying client data for the analytical risk management calculation;  
transferring the client data to a Java applet having analytics to perform the analytical risk management calculation;  
performing the analytical risk management calculation with the client data; and  
returning results of the risk management calculation.

13. The method of operating an analytical risk management tool according to claim 12 further comprising the step isolating the analytics from a client which requests the risk management calculation.

14. The method of operating an analytical risk management tool according to claim 12 further comprising the step configuring dynamically access to the Java applet in response to a particular client.

15. An applet having computer readable code stored on a server for operating in an object-oriented environment to serve clients having applet requests comprising:

analytics which perform a series of specifically identified operations in response to an applet request; and  
a server interface which provides clients access to the analytics to perform the series of specifically identified operations.

16. The applet according to claim 15, wherein the server interface receives client data and provides result data.

17. The applet according to claim 16, wherein the server interface includes an object-oriented interface to isolate the series of specifically identified operations of the analytics from the clients.

18. A client operating in an object-oriented environment having access to a plurality of applets for providing client services comprising:

a client terminal which provides access to the object-oriented environment;  
a client request which requests service from the applets; and  
an object oriented interface which receives the client request and directs an applet from the object-oriented environment to service the client request.

19. The client according to claim 18, wherein:

the client request includes client data for analytical calculations; and  
the object-oriented interface directs the client data to the applet for processing.

20. The client according to claim 19, wherein the object-oriented interface provides a transparent applet interface to the client terminal for interfacing the client request to the applet.

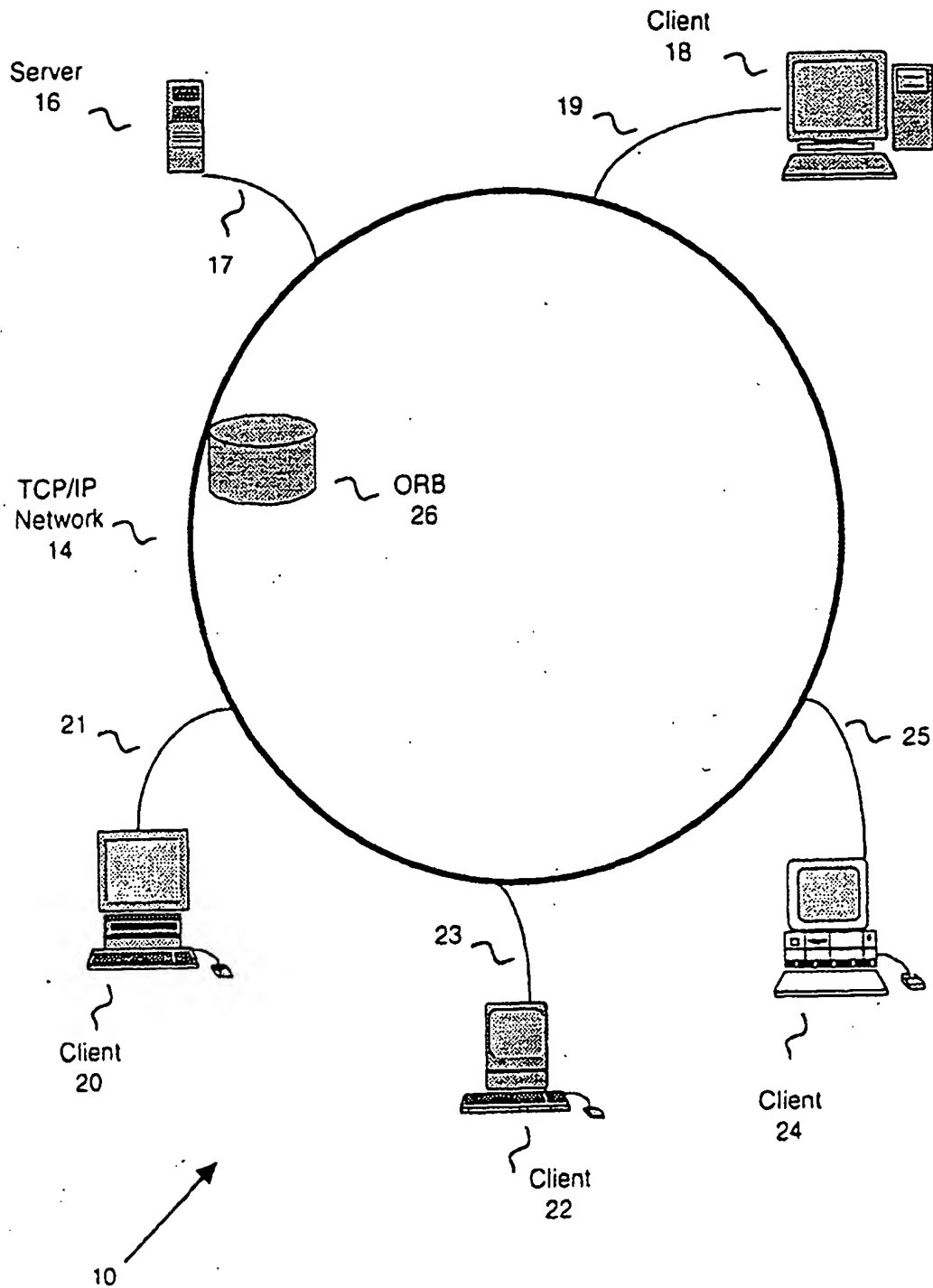


Fig. 1

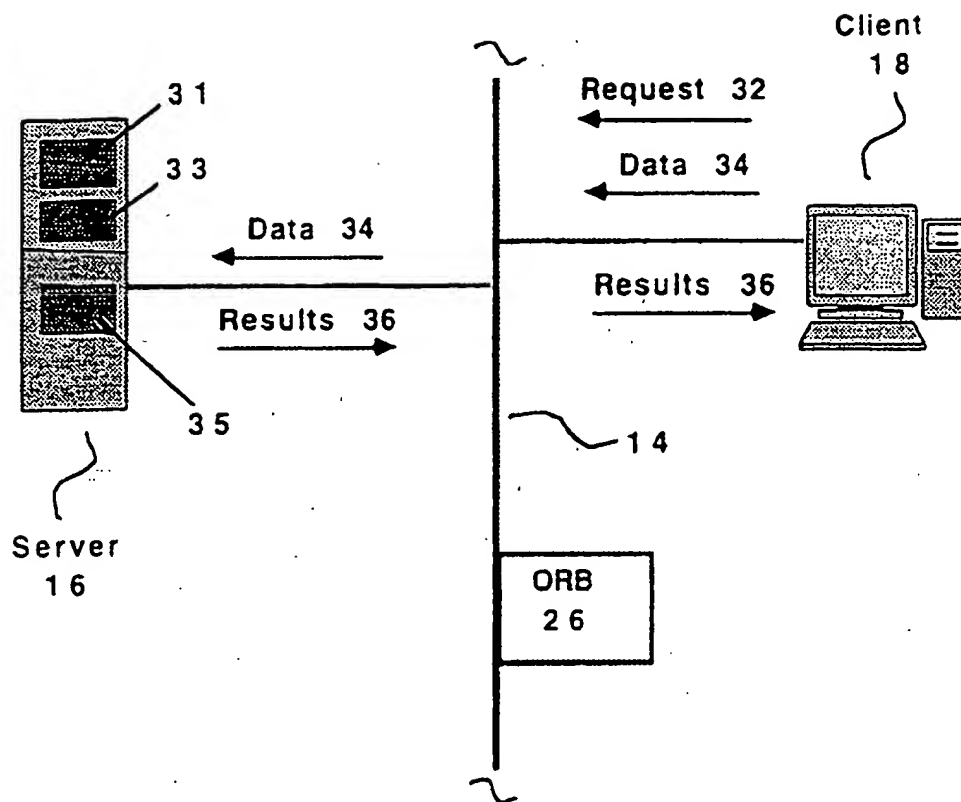


Fig. 2

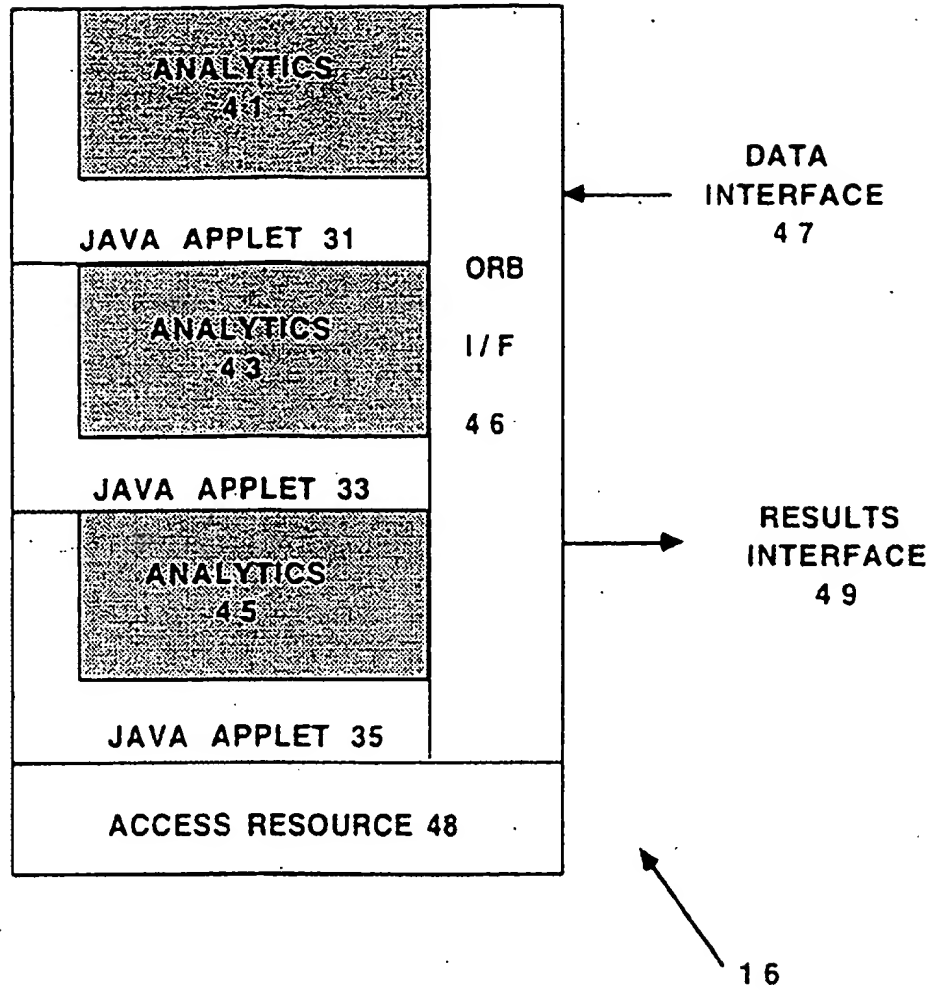


Fig. 3



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